

REMARKS

In the office action the Examiner reminded Applicant that the Abstract of the disclosure contained legal phraseology and should not exceed 250 words.

Applicant has submitted an amended Abstract to remove the legal phraseology and other objectionable phrases.

Further in this office action the Examiner rejected claims 1-7, 9, 11-12, 14-15, 18-19 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. (U.S. Pat. No. 5,559,378) in view of Fiegel et al. (U.S. Pat. No. 5,826,952) and further in view of Noltner (DE 2355728A).

To support the rejection the Examiner stated, "Oudet et al. substantially teaches the claimed invention except that it does not show an electric power generator comprising an O-ring in a groove formed on the outer surface of the first portion of the piston to prevent loss of air between the piston and the cylinder and permit air pressure in the cylinder to increase when the first portion of the piston is disposed within the cylinder. Oudet et al. do not disclose that an emf is generated in the electric coil, so that an external circuit connected to the electric coil receives electric power from the electric coil. Oudet et al. do not disclose that the inlet flowpath includes an air filter for excluding foreign material from the cylinder. Oudet et al. do not disclose that the inlet flowpath includes a choke to control an impedance of the inlet flowpath.

Oudet et al. do not disclose that the cylinder extension having an inner surface; having a transverse dimension greater than a transverse dimension of the cylinder. Oudet et al. do not disclose that at least a portion of the piston extension contacting at least a portion of the cylinder extension to provide positional constraint to the piston. Oudet et al. do not disclose that the portion of the piston extension contacting at least a portion of the cylinder extension is an outer surface of the piston extension and the portion of the cylinder extension is an inner surface of the cylinder extension. Oudet et al. do not disclose that the piston extension has at least one longitudinal air passage to carry air to an end of the piston adjacent the end closure, the exhaust being connected to the end closure. Oudet et al. do not disclose that the exhaust passage includes an electrically actuated shutoff valve to prevent air flow through the generator, thereby turning off the generator.

Fiegel et al. disclose sealing means disposed on at least one of an outer surface of the first portion of the piston (22) and an inner surface of the cylinder to prevent loss of fluid between the piston (22) and the cylinder and permit fluid pressure in the cylinder to increase when the first portion of the piston (22) is disposed within the cylinder.

Fiegel et al. disclose that the sealing means is an O-ring in a groove formed on the outer surface of the first portion of the piston (22). Fiegel et al. disclose that the inlet flowpath includes a fluid filter (62) for excluding foreign material from

the cylinder. Fiegel et al. disclose that the cylinder extension having an inner surface having a transverse dimension greater than a transverse dimension of the cylinder.

Fiegel et al. disclose that at least a portion of the piston extension (37 in figure 3) contacting at least a portion of the cylinder extension to provide positional constraint to the piston (22). Fiegel et al. disclose that the portion of the piston extension (63 in figure 4) contacting at least a portion of the cylinder extension is an outer surface of the piston extension (63) and the portion of the cylinder extension is an inner surface of the cylinder extension. Fiegel et al. disclose that the piston extension (37) has at least one longitudinal fluid passage (65) to carry fluid to an end of the piston (22) adjacent the end closure (32,35), the exhaust (35) being connected to the end closure (32). Fiegel et al. disclose that the passage (65) includes an electrically actuated shutoff valve (46-49) to prevent fluid flow through the actuator, thereby turning off the actuator. The invention of Fiegel et al. has the purpose of increasing efficiency and reducing the dimensions and weight of embodiment.

Noltner disclose an electric power generator whereby an emf is generated in the electric coil (5), so that an external circuit connected to the electric coil (5) receives electric power from the electric coil (5). Noltner disclose that the inlet flowpath includes a choke (10,11) to control an impedance of the inlet flowpath. Noltner's invention has the purpose of

showing that the electromagnetic piston-cylinder configuration can be applied in pumps, compressors, and generators which can be either hydraulically pneumatically or thermally actuated.

It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al. and provide it with the sealing means, filter, cylinder and piston configurations, longitudinal fluid passage, electrically actuated shutoff valves, and operate the embodiment as a generator as disclosed by Fiegel et al. and Noltner for the purpose of increasing efficiency and reducing the dimensions and weight of the embodiment and provide the specified electric power source configuration."

Applicant cannot believe that it would be obvious to one of ordinary skill in the art to modify the electromagnetic actuator of Oudet et al. and provide it with the sealing means, generation of emf in the electric coil, air filter, cylinder and piston configurations, longitudinal fluid passage and electrically actuated shutoff valves. There is less disclosed by Oudet et al. in relation to the present invention than there are similarities. In fact there is so little disclosed by Oudet et al., as indicated by the Examiner, that it would require major changes in Oudet et al., Fiegel et al. and Noltner to try to configure a pneumatic driven electric power generator that would work.

Items 70 and 71 are referred to as lateral poles by Oudet et al. Oudet et al. states, "The mobile device 50 includes a solid cylindrical part which moves axially in the cylindrical space

delimited by the lateral stator poles 70 and 71 and the central stator pole 54." And further, "These two volumes are connected by means of spaces 92,93 separating the central pole from the lateral poles 70 or 71." (Column 6, lines 65 to column 7, line 1) and (column 8, line 45-47).

The invention of Oudet et al. provides dual cylinders that are defined by such lateral stator poles 70,71. The mobile device 50 of Oudet et al. is positioned either in first cylinder delimited by lateral pole 70 or in second cylinder defined by lateral pole 71. Pressurized fluid enters from either input 80 or 82 and exhausts via gaps 91 and 93 or gaps 90 and 92 to pressure outlets 81 and 83, respectively. Springs (biasing means) 51 and 52 are positioned on either end of the mobile device 50. As Oudet et al. states, "Springs 51, 52 ensure the positioning of the mobile device in a position in which the junction 53 between the two ring shaped magnets 10 and 11 corresponds to the middle of the central pole 54." The teaching of Oudet et al., thus, provides for two springs or biasing means positioned on either end of the mobile device 50 which includes what the Examiner refers to as piston 56. Oudet et al. refers to 56 as a central hub. The teaching further includes what is essentially two mirror image cylinders each having their own separate inlets and outlets. There is never any transfer of fluid from the first cylinder to the second cylinder. When the mobile device is moved sufficiently from the first cylinder, pressurized fluid exhausts through gaps 91 and 93. Then second spring 51 and pressurized

fluid from input 82 forces the mobile device away from the second cylinder until the pressurized fluid is exhausted through gaps 90 and 92. The mobile device in the first cylinder is returned by means of first spring 52 and pressurized fluid from input 80. Thus, the teaching of Oudet et al. requires the use of two sets of springs, two pressurized fluid inlets and at least two exhaust ports (Oudet et al. has four exhaust ports) and as constructed will not operate properly with only one biasing means and one pressurized inlet.

The present invention, on the other hand, has one biasing means which is not positioned in the first cylinder. The present invention, as defined by claim 1, provides, "means engaging said piston for biasing said piston from said second position toward said first position so that after said first cylinder has substantially exhausted, said piston moves to said first position, whereby said piston oscillates, moving back and forth between said first position and said second position, driven by air supplied through such air supply passage to said cylinder".

The present invention further has only one cylinder with a first end connectable through an inlet flow path to an air supply passage. The teaching of Oudet et al. requires two inlet flow paths, one on each end of the device; a first connectable to a first cylinder and the second connectable to the second cylinder. The present invention provides for only one inlet flow path which is connectable to a first end of "said cylinder".

There is no mention at all in Oudet et al. that the piston 56 has a magnetic moment associated with it. The only mention of piston 56 in Oudet et al. is, "A central hub 56 is the final component of the mobile device 50." (column 7, lines 8,9). The present invention as defined by claim 1 provides for "a piston having a magnetic moment associated therewith". Although Noltner discloses a magnetic moment associated with piston (2,3), it is very difficult to understand how the piston of Noltner could replace the piston of Oudet, et al. or vice versa and come up with a unit that would work.

Further, the teaching of Oudet et al. provides for an actuator, "Contrary to current teachings in the field, the three pole actuator according to the invention incorporates one central pole and two lateral poles of different sizes. This embodiment, which the specialist find surprising, nevertheless makes it possible to maintain satisfactory performance levels while making possible the housing of a coil incorporating a large volume of copper." (Column 2, lines 3-12). There are no such poles provided in the present invention.

Fiegel et al. provides a brake system for automobile vehicles including a pedal-operable pressure generator connected to wheel brake cylinders of wheel brakes associated with individual wheels, at least two actuator units actuatable independently of the pressure generator and arranged in hydraulic connections between pressure generator and wheel brake cylinders to permit shutting off the hydraulic connections, each of the

actuator units including one cylinder-and-piston assembly and one actuator, and an electronic controller whose control signals serve to activate the actuator units, wherein, on simultaneous actuation of the pressure generator and at least one actuator unit, the force resulting from the pressure build-up in the pressure generator is added to the external actuating force generated by the actuator and applied to the piston on the cylinder-and-piston assembly. (Column 1, lines 1-20).

Applicant cannot believe that an engineer working on electrical power generators for railway applications would ever examine braking systems for automotive vehicles as a reference nor does Applicant believe that it would have been obvious to one having ordinary skill in the art to modify Oudet et al. with the sealing means or the piston/cylinder configuration as described by Fiegel et al.

Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claims 1-7, 9, 11-12, 14-15, 18-19 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. (U.S. Pat. No. 5,559,378) in view of Fiegel et al. (U.S. Pat. No. 5,826,952) and further in view of Noltner (DE 2355728A).

The Examiner rejected claim 8 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 7 above, and further in view of Higham et al. (U. S. Pat. 5,146,124).

The Examiner stated, "Oudet et al., Fiegel et al. and Noltner substantially teaches the claimed invention except that

it does not show that at least one of the outer surface of the piston extension and the inner surface of the cylinder extension is at least one of made from and coated with a low friction material.

Higham et al. disclose that at least one of the outer surface of the piston extension (10) and the inner surface of the cylinder extension (560) is at least one of made from and coated with a low friction material (532). The invention of Higham et al. has the purpose of reducing wear and friction of the contacting surfaces.

It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al., Fiegel et al. and Noltner and provide it with the low friction material disclosed by Higham et al. for the purpose of reducing wear and friction of the contacting surfaces."

Applicant has discussed previously that it is difficult to understand how one with ordinary skill in the art could modify Oudet et al. with Noltner and Fiegel et al. to produce a pneumatic driven electric power generator as that of the present invention and the addition of Higham et al. does not make it any more feasible, particularly since Higham et al. is describing a linear drive motor for a cryogenic refrigerator. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claim 8 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of

Noltner as applied to claim 7 above, and further in view of Higham et al. (U. S. Pat. 5,146,124).

The Examiner rejected claim 10 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 9 above, and further in view of Meyer (U. S. Pat. 4,352,645).

The Examiner stated, "Oudet et al., Fiegel et al. and Noltner substantially teaches the claimed invention except that it does not show that the at least one longitudinal air passage is a longitudinal slot formed in the outer surface of the piston extension.

Meyer discloses that the at least one longitudinal fluid passage (31) is a longitudinal slot formed in the outer surface of the piston extension (19). Meyer's invention has the purpose of providing a fluid discharge between two chambers of the embodiment.

It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al., Fiegel et al. and Noltner and provide it with the longitudinal slot disclosed by Meyer for the purpose of providing a fluid discharge between two chambers of the embodiment."

Applicant has discussed previously that it is difficult to understand how one with ordinary skill in the art could modify Oudet et al. with Noltner and Fiegel et al. to produce a pneumatic driven electric power generator as that of the present invention and the addition of Meyer does not make it any more

feasible. Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 9 above, and further in view of Meyer (U. S. Pat. 4,352,645).

The Examiner rejected claim 13 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 5 above, and further in view of Park (U. S. Pat. 5,451,727).

The Examiner stated, "Oudet et al., Fiegel et al. and Noltner substantially teaches the claimed invention. except that it does not show that the exhaust passage includes a muffler to reduce noise released from the generator.

Park discloses that the exhaust passage includes a muffler (31) to reduce noise released from the actuator. Park's invention has the purpose of diminishing noise and heat transfer thus improving the performance of the embodiment.

It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al., Fiegel et al. and Noltner and provide it with the muffler disclosed by Park for the purpose of diminishing noise and heat transfer thus improving the performance of the embodiment."

As discussed previously that it is difficult to understand how one with ordinary skill in the art could modify Oudet at al. with Noltner and Fiegel et al. to produce a pneumatic driven electric power generator such as that of the present invention

that adding Park to provide it with a muffler does not change the primary references. Furthermore, Park describes a noise suppressing apparatus for a hermetic reciprocating compressor which is hardly an applicable reference for a power generator

Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claim 13 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 5 above, and further in view of Park (U. S. Pat. 5,451,727).

The Examiner then rejected claims 16-17 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 1 above, and further in view of Konotchick (U. S. Pat. 5,347,186).

The Examiner stated, "Oudet et al., Fiegel et al. and Noltner substantially teaches the claimed invention except that it does not show that the at least one electric coil is connected to a rectifier to supply DC electric power. Neither Oudet et al., Fiegel et al. nor Noltner disclose that the rectifier is a full bridge rectifier to supply DC electric power whenever a net flux through the at least one electric coil is changing.

Konotchick discloses that the at least one electric coil (70-73) is connected to a rectifier (figure 5b) to supply DC electric power. Konotchick discloses that the rectifier is a full bridge rectifier to supply DC electric power whenever a net flux through the at least one electric coil is changing. Konotchick's

invention has the purpose of providing electrical regulation and the capability to handle small power surges.

It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al., Fiegel et al. and Noltner and provide it with the rectifier disclosed by Konotchick for the purpose of providing electrical regulation and the capability to handle small power surges."

As discussed previously that it is difficult to understand how one with ordinary skill in the art could modify Oudet et al. with Noltner and Fiegel et al. to produce a pneumatic driven electric power generator such as that of the present invention that the addition of Konotchick does not change that.

Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claims 16-17 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Fiegel et al. and further in view of Noltner as applied to claim 1 above, and further in view of Konotchick (U. S. Pat. 5,347,186).

The Examiner also rejected claims 20-21 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Noltner. The Examiner stated, "Oudet et al. substantially teaches the claimed invention except that it does not show an electric power generator whereby an emf is generated in the electric coil, so that an external circuit connected to the electric coil receives electric power from the electric coil.

Noltner disclose an electric power generator whereby an emf is generated in the electric coil, so that an external circuit

connected to the electric coil receives electric power from the electric coil. Noltner's invention has the purpose of showing that the electromagnetic piston-cylinder configuration can be applied in pumps, compressors, and generators which can be either hydraulically, pneumatically or thermally actuated. It would have been obvious at the time the invention was made to modify the embodiment of Oudet et al., and Noltner and provide it with the capability of operating the embodiment as a generator as disclosed by Noltner for the purpose of providing the electromagnetic piston-cylinder configuration application in generators which can be either hydraulically, pneumatically or thermally actuated."

As discussed previously in the rejection of other claims that it is difficult to understand how one with ordinary skill in the art could modify Oudet et al. with Noltner to produce a pneumatic driven electric power generator such as that described in claim 20.

Therefore, Applicant respectfully requests that the Examiner withdraw the rejection of claims 20-21 under 35 U.S.C. 103(a) as being unpatentable over Oudet et al. in view of Noltner.

In view of the discussion supra, it is believed that the invention as described in claims 1-20 is patentable and that this application is now in condition for allowance and such allowance by the Examiner is respectfully requested.

In the event the Examiner has further difficulties with the examination and/or allowance of the application, she is invited

to contact the undersigned agent for applicant by telephone at (412) 380-0725, if necessary, to resolve any remaining questions or issues by interview and/or Examiner's Amendment as to any matter.

Respectfully submitted,
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Appendix A

Please amend the Abstract of the disclosure as follows:

ABSTRACT [OF THE INVENTION]

[This invention is a] A pneumatically driven electric power generator[. It] includes a cylinder having one end connected to an air supply passage for receiving pressurized air[and it has another end open. The invention has] and a piston having an associated magnetic moment. A portion of the piston is free to move into and out of the open end of the cylinder. An O-ring prevents [Sealing means are provided to prevent] airflow between the piston and the cylinder when a portion of the piston is located within the cylinder. [Piston return means are] A spring [provided which tend to force] forces the piston from a position outside of the cylinder to a position [having a portion of the piston] inside the cylinder, so that the piston oscillates, moving into and out of the cylinder, driven by air supplied through the air supply passage. One or more electric coils are placed to enclose changing magnetic flux caused by the magnetic moment associated with the oscillating piston whereby an emf is generated in the coil(s) so that an external circuit connected to the coil(s) to complete a circuit through the coil(s) may receive electric power from the coil(s).